

1 **Amendment to the Claims**

2 **In the Claims:**

3 Please amend Claim 1 as follows:

4 1. (Currently Amended) An impeller configured to function as a combined fan and impact
5 collector, comprising a base plate and a plurality of vanes disposed on an upper surface of the base
6 plate, such that a ratio of vane height to base plate diameter is in the range of about 0.01 to about 0.2,
7 each vane curving between a first end that is disposed generally adjacent to an outer edge of the base
8 plate, and a second end that is disposed inwardly, substantially closer to a center of the base plate, at
9 least some of the plurality of vanes exhibiting at least one of the following characteristics:

10 (a) having a base that extends laterally to a greater extent than does an upper
11 surface of the vane; and

12 (b) being shorter in length than another one of the plurality of vanes.

13 2. (Previously Cancelled)

14 3. (Previously Cancelled)

15 4. (Previously Cancelled)

16 5. (Previously Cancelled)

17 6. (Previously Cancelled)

18 7. (Previously Cancelled)

19 8. (Previously Cancelled)

20 9. (Original) An impact particle collector for separating particulates from a gaseous fluid in
21 which the particulates are entrained, comprising:

22 (a) a prime mover having a drive shaft that is drivingly rotated;

23 (b) an impeller that is mechanically coupled to the drive shaft and rotated thereby, the
24 impeller comprising a base plate and a plurality of vanes disposed on an upper surface of the base plate,
25 such that a ratio of vane height to base plate diameter is in the range of about 0.01 to about 0.2; and

26 (c) a housing for the impeller, said housing defining a fluid passage for conveying
27 the gaseous fluid in which the particulates are entrained to the impeller, such that when the impeller
28 is rotated by the prime mover, the gaseous fluid is drawn into the housing so that the particulates
29 entrained in the gaseous fluid impact upon the impeller, being thereby separated from the gaseous
30 fluid when impacted by the vanes of the impeller.

1 10. (Previously Presented) The impact particle collector of Claim 9, wherein a base of each
2 of the plurality of vanes extends laterally to a greater extent than does an upper surface of each vane.

3 11. (Original) The impact particle collector of Claim 9, wherein the plurality of vanes are
4 configured such that a height of each vane adjacent a center of the base plate is larger than a height of
5 each vane adjacent to an outer edge of the base plate.

6 12. (Original) The impact particle collector of Claim 9, wherein the plurality of vanes are
7 configured such that each vane does not extend within about one millimeter of an outer edge of the
8 base plate.

9 13. (Previously Presented) The impact particle collector of Claim 9, wherein the plurality of
10 vanes are substantially evenly spaced upon the upper surface of the base plate, such that when the
11 impeller is drivingly rotated by the prime mover, the impeller presents a balanced load.

12 14. (Original) The impact particle collector of Claim 13, wherein at least some of the
13 plurality of vanes are truncated vanes.

14 15. (Original) The impact particle collector of Claim 13, wherein the housing includes an
15 opening disposed proximate a center of the base plate, and none of the vanes are disposed on a
16 portion of the base plate directly beneath the opening.

17 16. (Original) The impact particle collector of Claim 9, further comprising a nozzle in fluid
18 communication with a rinse fluid reservoir, the nozzle being disposed to introduce a rinse fluid at the
19 inward edges of the plurality of vanes, when the impeller is being rotated by the prime mover.

20 17. (Original) The impact particle collector of Claim 9, further comprising:

21 (a) a rinse fluid reservoir including a sensor configured to detect a level of rinse
22 fluid contained within the reservoir;

23 (b) a nozzle in fluid communication with the rinse fluid reservoir, the nozzle being
24 disposed to introduce a rinse fluid into the housing to rinse particulates off of the impeller; and

25 (c) a pump configured to deliver a rinse fluid from the rinse fluid reservoir to the
26 nozzle.

27 18. (Previously Presented) The impact particle collector of Claim 17, further comprising a
28 microcontroller electrically coupled with the sensor, and controllably coupled to the prime mover and
29 the pump, the microcontroller being configured to implement a plurality of functions, including at
30 least one of:

1 (a) reducing a rotational velocity of the impeller whenever a level of rinse fluid in
2 the rinse fluid reservoir falls below a predetermined level;

3 (b) reducing a volume of fluid delivered from the rinse fluid reservoir to the nozzle per
4 unit time, whenever a level of rinse fluid in the rinse fluid reservoir falls below a predetermined level; and

5 (c) de-energizing the prime mover whenever a level of rinse fluid in the rinse fluid
6 reservoir falls below a predetermined level.

7 19. (Original) The impact particle collector of Claim 18, further comprising a makeup
8 reservoir in fluid communication with the rinse fluid reservoir, the makeup reservoir providing
9 additional rinse fluid to the rinse fluid reservoir should level of rinse fluid in the rinse fluid reservoir
10 falls below a predetermined level.

11 20. (Original) The impact particle collector of Claim 18, wherein the rinse fluid reservoir is
12 coupled in fluid communication with a lower portion of the housing, and said lower portion of the
13 housing includes sloping surfaces configured to direct rinse fluid contacting the lower portion of the
14 housing into the rinse fluid reservoir.

15 21. (Original) The impact particle collector of Claim 9, further comprising a filter configured
16 to filter the gaseous fluid before the gaseous fluid contacts the impeller.

17 22. (Original) The impact particle collector of Claim 21, wherein the filter comprises a size-
18 exclusion membrane including pores of a predetermined certain size, such that particles larger than
19 the pores cannot pass through the membrane.

20 23. (Original) The impact particle collector of Claim 21, wherein the filter comprises a
21 magnetic membrane including pores of a predetermined certain size, such that nonmagnetic particles
22 larger than the pores cannot pass through the membrane, and magnetic particles smaller than the
23 pores cannot pass through the membrane.

24 24. (Original) The impact particle collector of Claim 21, wherein the filter comprises an
25 affinity-based membrane including pores of a predetermined certain size, such that particles larger
26 than the pores cannot pass through the membrane, and particles smaller than the pores and having a
27 corresponding affinity cannot pass through the membrane.

28 25. (Original) The impact particle collector of Claim 24, wherein the affinity-based
29 membrane comprises an antibody coating, such that particles having a corresponding antigen cannot
30 pass through the membrane.

1 26. (Original) The impact particle collector of Claim 21, wherein the filter comprises a
2 membrane including pores of a predetermined certain size, and a incorporating a chemical adsorbent,
3 such that particles larger than the pores cannot pass through the membrane, and chemicals absorbed
4 by the chemical adsorbent cannot pass through the membrane.

5 27. (Original) The impact particle collector of Claim 9, wherein the impeller has a mean
6 surface roughness selected to increase the likelihood that a particle entrained in the gaseous fluid will
7 adhere to the impeller.

8 28. (Original) The impact particle collector of Claim 9, wherein the internal surfaces of the
9 housing each have a mean surface roughness selected to decrease the likelihood that a particle
10 entrained in the gaseous fluid will adhere to the internal surfaces of the housing.

11 29. (Original) The impact particle collector of Claim 9, wherein the housing comprises
12 curved internal surfaces wherever a side of the housing joins an upper portion of the housing, and
13 wherever a side of the housing joins a lower portion of the housing, such curved internal surfaces
14 reducing the likelihood that a rinse fluid will be undesirably retained within the housing.

15 30. (Original) The impact particle collector of Claim 9, wherein an upper portion of the
16 housing comprises an opening for directing a gaseous fluid toward the impeller, and an external
17 surface of the upper portion of the housing is shaped as an inverted cone, with a base of the cone
18 corresponding to an outer edge of the upper portion, and an apex of the cone corresponding to the
19 opening, such that the apex of the cone is disposed lower than the base of the cone.

20 31. (Original) The impact particle collector of Claim 9, wherein an upper portion of the
21 housing comprises an opening for directing a gaseous fluid toward the impeller, and an internal
22 surface of the upper portion of the housing is shaped as an inverted cone, with a base of the cone
23 corresponding to an inner edge of the upper portion, and an apex of the cone corresponding to the
24 opening, such that the apex of the cone is disposed higher than the base of the cone.

25 32. (Original) The impact particle collector of Claim 9, wherein an upper portion of the
26 housing comprises an opening for directing a gaseous fluid toward the impeller, and an external
27 surface of the upper portion of the housing slopes away from the opening, such that a highest portion
28 of the external surface of the upper portion of the housing corresponds to an outer edge of the upper
29 portion, and a lowest portion of the external surface of the upper portion of the housing corresponds
30 to a periphery of the opening.

1 33. (Original) The impact particle collector of Claim 9, wherein an upper portion of the
2 housing comprises an opening for directing a gaseous fluid toward the impeller, and an internal
3 surface of the upper portion of the housing slopes away from the opening, such that a lowest portion
4 of the internal surface of the upper portion of the housing corresponds to an inner edge of the upper
5 portion, and a highest portion of the internal surface of the upper portion of the housing corresponds
6 to a periphery of the opening.

7 34. (Original) The impact particle collector of Claim 33, wherein each of the plurality of
8 vanes includes a sloping upper surface substantially corresponding to the slope of the internal surface
9 of the upper portion of the housing, such that a height of each vane is greater proximate a center of
10 the base plate than a height of each vane proximate an outer edge of the base plate.

11 35. (Original) The impact particle collector of Claim 33, wherein the impeller further
12 comprises a top plate having an opening in a center of the top plate, the top plate having sloping
13 upper surfaces and lower surfaces that substantially correspond to the slope of the internal surface of
14 the upper portion of the housing, such that a lowest portion of the top plate corresponds to an outer
15 edge of the top plate, and a highest portion of the top plate corresponds to an inner edge of the top
16 plate proximate the opening in the top plate.

17 36. (Original) The impact particle collector of Claim 9, wherein a gap exists between an
18 inner surface of an upper portion of the housing and the impeller, such that the gap is designed to
19 exceed an expected dimensional variation related to a manufacturing process used to produce the
20 impeller.

21 37. (Original) The impact particle collector of Claim 36, wherein the gap is about 2
22 millimeters.

23 38. (Original) The impact particle collector of Claim 36, wherein the gap is about 2.2
24 millimeters.

25 Claims 39-55 (Previously Cancelled)
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